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crinoids in other echinoderms, Professor Marshall says, "I consider that in crinoids the subepithelial bands most certainly are homologous with the radial or ambulacrinal nerves of a star-fish; and I consider that they represent a part of a continuous nerve-sheath which has retained permanently its primitive continuity with the epidermis. The axial cords, some of the branches of which can be traced into extremely close proximity with the subepithelial bands, I regard as portions of the antambulacrinal nerve-sheath which, like the radial cords of echinids, ophiurids, and holothurids, have lost the primitive position, and shifted into or through the dermis."

Mr. William Bateson, in a paper read by the secretary, upon the presence in the *Enteropneusta* of a structure comparable with the notochord of the Chordata, made some interesting comparisons in regard to the relative positions of the nervous system the digestive tract, and the supposed notochord in *Balanoglossus* and in vertebrates. He added further comparisons between this animal and the vertebrates, and between its larva 'Tornaria' and the larvae of echinoderms.

Among anatomical papers containing facts which have a less general bearing on theories of animal relationship may be mentioned, as of especial interest or importance, the following: Professor Moseley described the position and minute structure, as determined from sections, of the eyes and other sense organs in the shells of the Chitonidae. The same gentleman showed that the arrangement of the feathers in groups of three each in the dodo had a close connection with the filoplumae, or thread-feathers, one of which is found at each side of the feathers of birds of the dove-family, near which the dodo is placed. Earlier in the development of the doves' feathers, the filoplumae are larger, relative to the size

of the other feathers; and this condition resembles still more the condition found in the dodo. Prof. R. Ramsey Wright described the histological structure of certain sensory organs of the skin of the horned-pout (*Amiurus*), and discussed the function of the air-bladder in the same fish, and the relation of its air-bladder to the auditory apparatus. Prof. J. Struthers, of Aberdeen, described the rudimentary hind limb of the hump-backed whale (*Megaptera longimana*), and compared its thigh-bone with the same bone in other cetaceans. In a hump-backed whale forty feet long; the thigh-bone was entirely cartilaginous, being on one side four inches, and on the other five and a half inches long.

As a contribution to our knowledge of curious habits of plants, Prof. H. N. Moseley communicated some observations on the trapping of young fish by *Utricularia vulgaris*, a water-weed. After sketching and describing the bladders of this plant, which have been known for a long time to capture small crustacea, the speaker said that it had been lately discovered that these bladders also entrap young fishes. The fish, usually caught by the tail, is often, on account of its struggling, gradually drawn almost entirely into the bladder.

At the beginning of the session on Friday the 29th, reports of several committees were presented, among them that on the Naples zoölogical station. In this report, after mention of the various undertakings of the station, and of the work accomplished by Mr. A. G. Bourne and by Prof. A. Milnes Marshall, the two late occupants of the British association table at the station, the committee recommended that the association renew its grant for the table, and increase the amount paid to a hundred pounds (instead of eighty and ninety pounds as in previous years). This recommendation was adopted by the association.

### RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Trenton natural-history society.

*Aug. 12.*—Dr. C. C. Abbott continued his remarks on the life-history of *Scaphiopus solitarius*, the spade-footed hermit-toad. The adult toads appeared in April, when they presumably did not deposit eggs, and in June, on the 26th of which month eggs were laid. These hatched by July 3, and six days later the tadpoles showed small hind-legs. In thirty-one days after laying the eggs, the young resembled the adults in all except size, and, when placed on wet sand, at once buried themselves. Before leaving the water, they tend to prey upon each other. —Dr. A. C. Stokes remarked in reference to a captive Tarantula arenicola, that, having been deprived of building-materials, she erected a wall of earth and small pebbles, and on July 8 formed an irregular dome over the burrow, leaving a central opening, which she closed with web. July 28 she

destroyed the dome, and emerged with her abdomen thickly covered with young spiders. Although the latter were presumably only ten days old, they were becoming venturesome. They swarmed over the mother; but, when trespassing on her face, they were swept off by a stroke of her leg, and allowed to run back to her body. Occasionally they climbed up the tube, and wandered about the surface. Formerly the mother was very timid, retreating into the burrow when the observer arrived at a point twelve feet from the entrance; but, after the young appeared, she permitted the observer to approach and move about at pleasure. She also accepted food from the hand. She took a fly, and remained at the surface sucking its juices. The fly was removed from her mandibles by forceps, and a black ant offered; but it was thrown away as she throws away the excavated earth. A full account of the habits of this spider will be found in *Science*, iv. 114.

## Cincinnati society of natural history.

*Aug. 5.*—Mr. U. P. James presented a paper on conodonts and fossil annelid jaws from the lower Silurian of south-western Ohio. The only annelid heretofore noticed from these rocks in Ohio is that described by Prof. G. B. Grinnell in *Amer. Journ. Sc.*, September, 1877, under the name of *Nereidavus varians*, and referred to the jaw apparatus of an annelid. Mr. James has discovered other forms which are similar in character. They occur as small, dark, shining objects, varied in form, and detached from each other, of a glossy black tint, though changed by weathering to a rusty red. They are composed of chitinous matter, and undergo no change in nitric acid. Mr. James has identified some of the forms with species described by Mr. G. J. Hinde. Conodonts were first noticed by Pander, in 1856, and have been referred to as fish-teeth. Though their zoölogical relations cannot be finally determined until found in position, the best authorities agree in thinking them the lingual armature of large naked mollusks. Dr. Newberry has described conodonts from the Cleveland shale of the Waverly group in Ohio, and Mr. Hinde figures forms from the Silurian of Canada, and Devonian of the United States. They are now identified from the Cincinnati group of Ohio, some of the forms being identical with those from Canada and England.—Mr. Charles Dury stated that he thought the Oswego and black bass (*Micropterus dolomieu* and *M. nigricans*) were but forms of one species. The black bass is always found in swift-running streams, while the Oswego bass inhabits sluggish waters, ponds, and lakes. The Oswego bass is of a much larger size, lighter color, and has a larger mouth, than the black bass: hence the name of the white or large-mouthed bass. Ross Lake, an artificial pond near Cincinnati of about forty acres, was stocked a few years ago with black bass. It now swarms with the other form. Though many specimens of *M. dolomieu* have been taken, not a single *M. nigricans* has been caught, as far as known. Other instances were cited in which the large-mouthed species had appeared in ponds which were stocked with the small-mouthed form. Mr. Dury concluded that the Oswego bass is a variety of the black species, due to a difference in habit and to a superabundance of food. Dr. W. A. Dun said that he had caught the large-mouthed species in the Kanawha River, under the falls, though he thought that Mr. Dury's conclusion was in the main correct. Dr. D. S. Young agreed with Mr. Dury. He said, that, as far as color was concerned, he had observed that to vary with the season. The fish were of a lighter color in summer and in warm water than in winter and in cool water. He had caught the large-mouthed bass in rapid-flowing streams, under circumstances which showed that they had probably escaped from overflowed ponds or dams.

## NOTES AND NEWS.

THE McGill university convocation conferred upon the following members of the British association, at

its final meeting in Montreal, the honorary degree of LL.D.: Lord Rayleigh, the Governor-general of Canada, Sir Lyon Playfair, Sir William Thomson, Professor Bonney, Professor Frankland, Captain Douglas Galton, A. G. Vernon Harcourt, Sir Henry E. Roscoe, Professor Blanford, Professor Moseley, General Leffroy, Sir Richard Temple, Sir Frederick Bramwell, Dr. E. B. Tylor; also upon the president of Toronto university, Professor Daniel Wilson, Professor Asa Gray of Harvard, and Professor James Hall, New York state geologist.

—At the recent meeting of the British association in Montreal, the general committee appropriated to scientific purposes certain grants of money for the ensuing year, amounting in all to £1,515. In the department of *mathematics and physics*, the largest sum (£100) is devoted to the calculation of mathematical tables; £70 is to be used in the investigations on meteoric dust; synoptic charts of the Indian ocean and meteorological observations on Ben Nevis each receive £50; one-half this sum is devoted to meteorological observations near Chepster; £20 is given for the study of solar radiation, and £10 for the reduction of tidal observations in the English channel. In *chemistry*, £25 is devoted to vapor pressures and refractive indices of salt solutions, £20 to physical constants of solutions, and £5 to chemical nomenclature. In *geology*, for volcanic phenomena of Vesuvius, £25; for the Raygill fissure, £15; for earthquake phenomena of Japan, £75; for fossil Phyllopoda of the British paleozoic rocks, £25; for fossil plants of British tertiary and secondary beds, £50; for geological record, £50; for erosion of sea-coasts in England, £10; for circulation of underground waters in England, £10. In *biology*, for a table at the zoölogical station at Naples, £100; for a record of zoölogical literature, £100; for observations on the migration of birds, at light-houses and light-ships in England, £30; for an exploration of Kilimanjaro and the adjoining mountains of equatorial Africa, £25; for recent Polyzoa, £10; for the marine biological station at Granton, Scotland, £100; for marine biological stations on the coast of the United Kingdom, £150. In *geography*, appropriations were made for the exploration of New Guinea by Mr. Forbes to the amount of £200; and the exploration of Mount Roraima, in Guiana, by im Thurn, £100. In the department of *mechanics*, £5 was devoted to patent legislation. In *anthropology*, £50 is to be used for the investigation of characteristics, physical and otherwise, of the north-western tribes of Canada; and £10 for the study of the physical characteristics of races in the British isles.

—The *Annuaire* of the bureau of longitudes of Paris for 1884 (p. 847) contains M. Janssen's report on the French expedition to observe the total solar eclipse of 1883, May 6. The text of this report has been previously printed in the *Comptes rendus*; and it is referred to here principally to call attention to the photograph of the corona given on p. 852, which did not accompany the report in the first instance. This photograph was made with a camera, mounted